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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/895,941	06/29/2001	Yechiel Yochai	07072-141001 / EMC-01-036	9331

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EXAMINER	
PORTKA, GARY J	

ART UNIT	PAPER NUMBER
2188	

DATE MAILED: 12/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/895,941	YOCHAI ET AL.	
	Examiner	Art Unit	
	Gary J Portka	2188	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 October 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1 and 10 have been amended, and claims 12-15 have been added by Applicant. Claims 1-15 are pending.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 13 and 15 recite the limitation "the selected" in line 2 of the claim. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-15 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Mason, Jr. et al., U.S Patent 6,112,257, in view of Saether et al., U.S. Patent 5,333,315.

7. As to claims 1 and 11, Mason discloses the recited method of optimizing system physical device response time including collecting statistics for the physical devices (see Figs. 5E, 5I, 5K, 5P,5T, etc.), determining n most active devices (since the table records the activity for each drive, it determines to the extent claimed which are the n most active, see also Fig. 4B item 230), for each of those devices adjusting a mirror service policy associated with one or more logical volumes to reduce seek time (Fig. 3, also Fig. 4B item 236).

Alternatively, it might be asserted that the claim limitation "determining ... n most active of the physical devices" requires the determination/identification/indication of some number "n" of the most active devices. Mason, Jr. does make a determination of the n most active logical volumes (see col. 5 lines 16-21), but regarding devices only determines the activity of all devices. Since the n most active logical volumes are the ones most directly affecting performance, it makes the most sense to determine what they are and yet minimize the resources required to process the mirroring adjustment by not processing all, including perhaps dormant logical volumes, to achieve this. Additionally, it was well known at the time that monitoring the load of and balancing amongst physical devices would benefit overall system performance, see Saether col. 6 lines 21-45. This balancing necessarily requires identifying the n most active devices; clearly the term "balancing" signifies that devices that are most active require data to be

moved to less active devices. The movement of files amongst disks to improve performance as taught by Saether is analogous to the adjustment of mirror service policy used by Mason, Jr., because the latter changes the disks that are accessed in a similar manner, except that files need not be moved as in Saether since copies thereof already exist at the mirrors. Thus the teaching that physical devices should be monitored and balanced for optimum performance, thereby teaching determination of the most active, combined with the teaching that using the n most active elements most directly optimizes without overextending processing and storage required therefor, would have motivated an artisan to determine the n most active devices in Mason, Jr. Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to determine the n most active devices, because it was known that the device should be monitored for load balancing to increase performance, and balancing across the most n elements provides more efficient optimization.

8. As to claims 2 and 10, the combination of Mason, Jr. and Saether teaches the invention substantially as described above with regard to claims 1 and 11; it also includes the recited utilization and threshold, since Mason, Jr. teaches these elements and the combination teaches their use with respect to physical devices.

9. As to claims 3-9 and 12-15, the combination of Mason, Jr. and Saether includes the recited limitations to the extent claimed, or they are obvious variations thereof. That is, cost function analysis is disclosed in Mason as the use of the collection of data shown in Figs. 5. Any processing that occurs to implement a new mirror service policy,

before it is actually implemented, may be considered the simulation to the extent claimed.

Response to Arguments

10. Applicant's arguments filed October 4, 2004 have been fully considered but they are not persuasive.

11. Applicants argue that Mason does not teach determining n most active devices. As previously stated and reasonably broadly interpreted, Examiner disagrees. The claim does not require identification of which devices are the n most active, or indication of which are the n most active, only "determining n most active". Because Mason determines the physical activity level of all drives (e.g., Fig. 5E), Mason "determines n most active". As previously objected to, and as traversed, n could for example be considered any number such as 1 or all of the devices. In either of these or in any other case, "n most active" are determined by the table of Fig. 5E. It is further noted that even if Mason adjusts a mirror service policy for all devices, it does so for the n most active.

12. Applicants argue that Saether does not teach determining n most active devices. Examiner disagrees as stated hereinabove; monitoring of disk I/O and balancing requires that the data on more active devices be moved to less active devices, thus requiring determining the most active devices. That is, Saether has to identify the most active devices to move data therefrom to less active devices, the general definition of balancing.

13. Applicants argue that there is no motivation to combine the references because they are not analogous. Examiner disagrees; each is concerned with optimizing

performance in a multi-disk system and an artisan would have sought to combine any teachings that might be derived therefrom in any multi-disk system.

14. Applicants argue that neither reference teaches the recited cost function analysis and its use, but Examiner responds that as reasonably broadly interpreted these limitations are taught in the implementation of Mason as stated hereinabove. Applicants argue that neither reference teaches processing logical volumes in the recited sequence, but Examiner responds that when an outer logical volume as recited is processed, any further processing reads on the recited sequence.

Conclusion

15. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gary J Portka whose telephone number is (703) 305-4033. The examiner can normally be reached on M-F 9:30 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mano Padmanabhan can be reached on (703) 306-2903. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Gary J Portka
Primary Examiner
Art Unit 2188

December 11, 2004